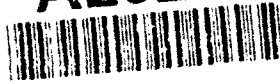


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**The Light Armored Cavalry Regiment---
Reconnaissance Force of The Future**

**A Monograph
by
Major Mark T. Littel
Armor**

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**School of Advanced Military Studies
United States Army Command and General Staff College
Fort Leavenworth, Kansas**

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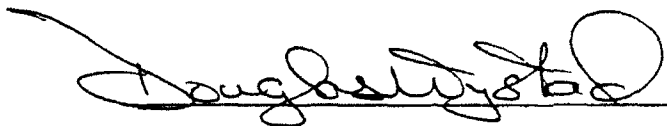
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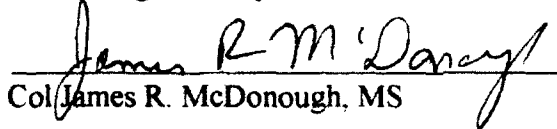
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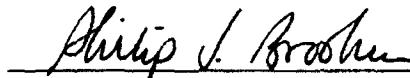
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**School of Advanced Military Studies
United States Army Command and General Staff College
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ABSTRACT

THE LIGHT ARMORED CAVALRY REGIMENT--THE RECONNAISSANCE FORCE OF THE FUTURE, by MAJ Mark T. Littel, USA, 54 pages.

This monograph discusses the current viability of the Light Armored Cavalry Regiment as the designated cavalry regiment for contingency force operations. As force projection is now the strategy of the United States, it is especially important that the Light Armored Cavalry Regiment be properly organized and equipped to conduct assigned missions in this environment.

This monograph examines the history of the cavalry regiment from World War II to present day, with emphasis on the characteristics of wartime employment of the Light Armored Cavalry Regiment. Analysis of the capabilities of the Light Armored Cavalry Regiment is executed against specific criteria, and contrasted with the heavy cavalry regiment as a basis for comparison.

The Light Armored Cavalry Regiment is a viable component in the context of force projection operations with a contingency corps. The primary use of the Light Armored Cavalry Regiment as a reconnaissance and limited security force is recommended. The Light Cavalry Regiment can accomplish its missions within the confines of this study.

TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
I - Introduction	1
II - Light Armored Cavalry Regiment	5
III - Historical Background of Cavalry Post WWII to Today	11
IV - Scenario Analysis	21
V - Conclusions and Implications for the Future	35
Appendices	
A---Cavalry Organizations	38
B---Terms and Definitions	40
C---New Systems Data	43
D---Light Armored Cavalry Regiment Data	44
E---Lethality Table	45
Bibliography	56

I. INTRODUCTION

Historically, military commanders have required accurate and reliable reconnaissance forces in order to be successful in battle. Gaius Julius Caesar used his cavalry, the light armed Numidians, to lead his legions to victory over the Belgic Tribes in 57 B.C. Their use as both reconnaissance and attack forces paved the way for victory.¹ Today's commanders expect the same level of success in battle with even the most modern reconnaissance forces.

U.S. Army reconnaissance forces have evolved throughout history from the dashing horse cavalymen of the frontier to the beginning of Armored Cavalry in World War II. Since the Second World War, the heavy cavalry has continued to evolve, owning a massive array of combat killing systems. From the M1A1 tank to the Apache attack helicopter, the commander of a modern cavalry organization has approximately 30% of the combat power of a heavy division, and greatly exceeds the combat power of any of the light divisions currently on active duty. As we move into the future, this cavalry organization will continue to change to meet the requirements of the future battlefield.

Political realities, changing international threats, and the end of the Cold War have brought about fundamental change in both U.S. military strategy and doctrine. In military strategy, U.S. forces are now completing the largest permanent redeployment of troops from overseas since World War II. Consequently, any military response to threats to U.S. national interests in the future must be executed by predominantly CONUS-based forces.

Both equipment and organizations in all military services have been or will be modified or changed to meet the new challenges posed by this new strategy. Naval and air forces have realigned and changed organizations to meet the new strategic lift requirements of this force projection focus. The renewed importance of the C-17 aircraft in the context of strategic lift is but one example of major equipment improvements being accomplished by the military services. The US Army has not been excluded from these force structure and equipment innovations and it has changed both organizations and equipment to meet the coming challenges.

Current doctrine is, in fact, changing to meet these evolving strategies. FM 100-5, Operations, the Army keystone warfighting manual, is now in draft revision. Today doctrine has become the engine of change in the United States Army.² This implies that all modifications to U.S. Army forces, either in organization, equipment, training, or tactics will be more directly linked to the transforming world environment through this renewed emphasis on doctrine. Much of the warfighting doctrine change stems directly from these new military requirements for a force projection capability. Eventually, many forces, both on active duty installations and in Reserve or National Guard units, will also modify force structure, equipment, and organizations to keep pace with this evolving doctrine.

In a July 1991 Joint Warfighter Conference, senior Army leaders identified a significant shortcoming in the strategic plan. While defending against an invasion from Iraq (in a simulation exercise that occurred just prior to the actual

invasion of Kuwait by Iraq in August 90), a window of vulnerability was identified where no heavy forces were in place fast enough to support the war plan. Although a division ready brigade of the 82nd Airborne had deployed quickly, it was (in the simulation) unable to provide much protection for the lodgment area. Additionally, the corps commander did not have a reconnaissance force allocated to him that could quickly deploy to an area of conflict. As a result of new requirements to deploy to a crisis area quickly, army leaders identified a significant war-fighting shortfall. The solution to that shortfall was the subsequent development of an organization known as the Light Armored Cavalry Regiment (LACR). From its inception, the mission of the Light Armored Cavalry Regiment would be to conduct early reconnaissance and security operations in support of contingency operations.

This monograph studies the Light Armored Cavalry Regiment (LACR) and its viability as a reconnaissance and security force for a contingency corps. The essential question to answer is whether or not the Light Armored Cavalry Regiment, as developed and equipped, is capable of performing its missions across the spectrum of conflict. The answer to this question is important, as the LACR must be able to support the contingency corps commander in support of force projection operations.

The study begins with a detailed examination of the missions, organization, and equipment of the light armored cavalry regiment. This survey will include a discussion of the major tank killing systems, with a generic combat correlation of

forces being applied to the LACR to assist in further analysis. A historical perspective on cavalry operations from World War II to present will follow, focusing on force structure and equipment changes, and why those changes came about. Conclusions in the historical section will provide critical information about the evolution and employment of the heavy cavalry regiment that may impact on the LACR as well. Analysis of the LACR will then be conducted, centering around a fictional tactical scenario, in a mid-high intensity conflict. The analysis of the LACR within this scenario centers around five key criteria that were important during the evolution of the LACR. The criteria are: deployability, lethality, protection, sustainability and continuous operations. The analysis will include the heavy armored cavalry regiment as background for examination. Conclusions to this study will ascertain whether or not the LACR, as currently designed³, will provide the contingency corps commander with a rapidly deployable, mission capable reconnaissance and security force.

II. NEW REQUIREMENTS FOR THE CAVALRY

As early as 1987, then Congressman Dick Cheney envisioned a revolutionary, and somewhat futuristic, strategy focusing on force projection and de-emphasizing the use of forward deployed forces. Even then, Mr. Cheney called for a strategy that harnessed the intellectual capacity of the defense establishment for building two forces. Those concepts form the basis of an evolving national strategy developed by Secretary of Defense Dick Cheney and his advisors.⁴ That strategy focuses on primacy of deployable, lethal forces, with limited forces forward deployed to react to emergencies. This emerging strategy requires a flexible force with new organizations that are doctrinally based, and that provides for a flexible range of options for the civilian and military leaders of our nation.⁵

The LACR, when deployed, would operate initially under the control of the senior ground force commander, and under the contingency corps commander upon his arrival. The primary mission of the LACR will be to conduct reconnaissance and security operations, focusing on protection of the main body of the corps assembling at the lodgment area. The light armored cavalry regiment organization will assist in expansion of the lodgment area after initial lodgment seizure by a division ready brigade (DRB) from the 82nd Airborne Division. This has become the base concept for the LACR.⁶

The initial concept for the LACR was approved by the U.S. Army Chief of Staff in September 1991. The expected missions of the LACR included most of the missions developed in FM 17-95, Cavalry Operations, but the missions could

be tailored for the type of conflict and threat forces involved. The LACR will perform offensive and defensive cover, as well as reconnaissance and security missions in low intensity conflicts. In a mid to high intensity conflict, the LACR can only perform reconnaissance and security missions, with self protection as its only defense against a heavily armored formation.⁷

The design criteria for the LCR were:

- a. Must be deployable by C141 aircraft
- b. Must be 100% mobile
- c. Must have organic combat service support
- d. Must be a combined arms formation
- e. Troops must be modeled after heavy armored cavalry units, including pure tank and scout platoons.⁸

This design criteria was intended to develop an organization similar to the heavy cavalry regiment. It provided for a common organization so as not to confuse soldiers as they moved from unit to unit.⁹ This standardization benefits not only the units, but the training base, where the organizations remained essentially the same. As we shall see later, this resemblance does not include capabilities of either weapons or units.

The Light Armored Cavalry Regiment that was approved in August 1992 looks remarkably similar to the heavy cavalry regiment of today, and in fact is not dissimilar to the 1947 ACR formation. (See Appendix A-Cavalry Organizations)

The LACR has an organic regimental headquarters, complete with a headquarters

troop to assist in command and control of the elements at regimental headquarters level.

There are several separate companies/troops that provide combined arms support to the LACR. The Air Defense battery, equipped with 18 Avenger air defense missile systems, is designed to provide air defense coverage for the entire regiment as it deploys into the lodgment area. The engineer company is equipped with six Armored Combat Engineer Vehicles (ACE), three Volcano mine dispensing systems, and three mine clearing charges (MICLIC), all designed to support the LACR with mobility, countermobility, and survivability systems throughout the battlefield. The chemical reconnaissance troop, outfitted with an NBC reconnaissance platoon and a smoke generation platoon, provides both chemical reconnaissance and decontamination capability for the regiment on an area basis. The military intelligence company provides organic intelligence gathering systems for the regiment as it deploys to and away from the lodgment area. The last separate company under the control of the regiment is the antitank troop. It is equipped with 12 non-line-of-sight (NLOS) antitank missile systems, capable of engaging tanks systems that are over the horizon, beyond direct line of sight. These systems all serve to support the squadron-sized forces in the regiment.

There are a total of five squadron-sized units in the regiment: three light cavalry squadrons, one air cavalry squadron, and one support squadron. Each organization has unique capabilities to provide to the LACR.

The three light cavalry ground squadrons, each having three cavalry troops, a light tank company and a howitzer battery, are the primary combat elements of the regiment and provide the bulk of the firepower, reconnaissance, and security capability. These ground squadrons will quickly deploy after arrival in the lodgment area, providing early warning for the follow-on forces. The two key combat systems in the ground squadrons are the XM8 Armored Gun System (a prototype label)¹⁰ and the M113A3 Armored Personnel Carrier. The M113A3 is the primary system for the scouts within the regiment. The Armored Gun System (hereafter referred to as AGS) has a 105mm gun, similar in design to the M60 series tank gun.¹¹ It also has a three man crew with an automatic loader. The AGS has some armor protection, but the maximum weight of the system is 28 tons.¹²

The combat aviation squadron is an integral part of the reconnaissance and security efforts for the LACR. It is organized into a headquarters troop, four aerial reconnaissance troops, one helicopter lift troop, and one aviation maintenance troop. The squadron is equipped with fifteen UH-60 Blackhawk helicopters and thirty-six multipurpose light helicopters (MPLH). The MPLH is essentially an OH-58D series helicopter, equipped with Stinger air-to-air missiles or Hellfire air-to-ground missiles.¹³ The Blackhawk troop provides helicopters for both essential lift requirements (seven each) and command and control requirements (eight each). The command and control helicopters are configured with special communications packages to support the operation.

The MPLH conducts aerial reconnaissance in support of regimental or squadron missions. In many instances, one aerial reconnaissance troop is placed under the operational control of each ground squadron to provide air reconnaissance as far forward in the regimental zone as possible. The intent is to push reconnaissance of all types as far forward in the regimental zone as possible. The MPLH is better suited for reconnaissance than an attack helicopter such as the AH-64 Apache, as it is lighter and designed specifically for reconnaissance operations.

Ever present, even in the lodgment area, are the combat service support (CSS) systems that keep the regiment's combat systems armed, fueled, fixed, and ready. The support squadron, with all of its organic equipment, provides maintenance, supply and service, transportation, and medical support to the regiment. The squadron has a headquarters troop, a supply and transport troop, a maintenance troop, and medical troop. The support squadron is capable of detaching combat service support teams to each ground squadron as the need arises. These teams may be attached to the ground squadrons from departure at the CONUS-based airfields through return to home station.

The LACR organization met the requirements of the design prerequisites, except the requirement to be all C-141 deployable. There are some items of equipment in the support squadron and the ground squadrons that can fit only on the C-5A aircraft. This will be discussed in more detail in the analysis section of the monograph.

The LACR was approved by the Chief of Staff of the Army on 7 August 1992.¹⁴ Before an analysis of the LACR is conducted, it is necessary to examine the growth of the heavy armored cavalry regiment from its inception after World War II. This historical information will provide a perspective on how the heavy armored cavalry regiment was organized in 1947, and how it evolved to its present day configuration.

III. HISTORICAL PERSPECTIVE

An examination of the evolution of the World War II Cavalry Group to the present day heavy ACR provides useful insights into how and why the regimental organizations changed over time.

As World War II came to a close, the US Army made significant efforts to catalogue and review the major battles of the war, as well as the organizations which fought them. Groups of officers and noncommissioned officers gathered at the training centers around the country, searching for ways to improve the cavalry organizations that they had served in prior to, and during the Second World War.

Cavalry groups, the armored reconnaissance organizations of the war, came under significant scrutiny from 1945-1947. Several crucial lessons were learned in the area of cavalry operations. First, it was determined that cavalry units in the future needed to be mobile enough to meet the tough requirements of the new mounted era. Second, these units needed to possess sufficient protection to survive on a much more dangerous battlefield. Third, whatever the organization was to become, the reconnaissance forces need to be capable of fighting for information if required. Although stealth and guile were still the most desired technique used to obtain information, the lethality of the organization had to be sufficient to fight for information.¹⁵ These requirements for combat in the future were the basis, then, for the Cavalry Regiment of the post war era.

The subsequent structure for the heavy ACR of post World War II was approved and implemented in 1947 (See Appendix A-Cavalry Organizations). The

cavalry regiment was a triangular organization that by its flexible design provided three ground reconnaissance squadrons that could be used in a variety of missions

The equipment in the organization included light tanks, scout jeeps and half-tracks, and small caliber howitzers. This equipment, by the standards of that period, met the requirements for the 1947 organization. The 1947 organizational structure would remain essentially unchanged until midway through the Vietnam War.

The 1947 cavalry regiment, as with most organizations that existed in the 1950's, did not change its organization or equipment during that timeframe for several reasons. First, it was an essentially sound organization that, although not battle tested, was developed after World War II in a logical, systematic approach. Second, it had fallen into the Pentomic Era stalemate along with the rest of the Army, playing a supporting role while the military as a whole focused on the much more cost-effective nuclear and air defense umbrellas. This strategy of massive retaliation, coupled with President Dwight D. Eisenhower's focus on economic recovery,¹⁶ ensured that any future changes in the armored cavalry regiment would be postponed until the guns of war began to sound again in the 1960's.

With the gradual escalation of forces into the Vietnam War in the early 1960's, initial emphasis for the U.S. military centered on counter insurgency operations. This meant that the primary forces initially involved in the war were infantry and special forces units. It was not until halfway through the decade that U.S. armored formations roared into combat in Vietnam for the first time. The 11th

Armored Cavalry Regiment deployed to Vietnam when General Westmoreland requested their use in December 1965 (See Appendix A- Cavalry Organizations) ¹⁷

After being shipped to Vietnam on strategic shipping assets, the 11th Armored Cavalry Regiment transitioned to M113 Armored Personnel Carriers. The older wheeled scout vehicles and M41 light tanks of the Pentomic Era were relegated to another part of history. All of the tanks in the cavalry troops were also replaced with the M113. The M113 had a 50 caliber machine-gun effective against unarmored and lightly armored vehicles.

The new M113 Personnel Carrier was modified within the first year of fighting with an armored shield added to protect the track commander from small arms fire and shrapnel wounds. ¹⁸ It quickly earned the name Armored Cavalry Assault Vehicle (ACAV). ¹⁹ The ACAV was also equipped with two additional 50 caliber machine-guns, giving the ACAV a marked firepower advantage over the enemy, who was for the most part dismounted. Transition from essentially wheeled scout and light tank vehicles to these heavily armored cavalry reconnaissance vehicles provided more than an incremental improvement in protection and mobility for the cavalryman. Although the lack of tank firepower was a noticeable deficiency, this shortcoming would be eliminated in a few short years.

In 1969, the regiment was also outfitted with the M551 Sheridan, a light armored reconnaissance tracked vehicle, which had as its armament a 152 mm gun/launcher. ²⁰ Although not considered a tank, this reconnaissance vehicle had tremendous firepower, with the 152mm gun one of the largest direct fire systems

in theater. The Sheridan was capable of engaging targets to ranges of 3,000 meters with the Shillelagh antitank guided missile. As an additional boost to the combat power of the regiment, the air cavalry troop was activated to provide the regimental commander with organic helicopter reconnaissance assets. The firepower and offensive nature of the 11th Cavalry had reached a new high.

Throughout the remainder of the Vietnam War, the 11th Armored Cavalry was employed in essentially an offensive mode. From Operation Fargo (21 Dec67-21 Jan68)²¹, to the 11th ACR incursion into Cambodia in June 1970²², to Operation Montana Raider in 1971²³, the regiment was aggressive, offensively oriented, and very destructive as a combat force. Retired Major General George S. Patton Jr., as one of the several commanders of the 11th Armored Cavalry Regiment in Vietnam, coined the phrase "***FIND THE BASTARDS THEN PILE ON***"²⁴ when referring to the offensive nature of cavalry operations in Vietnam.

The combined effects of tanks, ACAV's, and artillery were used in "thunder runs"²⁵, which were violent attacks by fire and maneuver against the enemy, throughout the war. These thunder runs were normally conducted on roads and trails to exploit the speed, firepower, and protection of the cavalry regiment against an asymmetrical enemy. The North Vietnamese regular and irregular forces were predominantly light forces, augmented with tanks when necessary. The armored cavalry regiment in Vietnam had not performed the traditional reconnaissance and security missions expected of a cavalry organization, but had performed as an armored force tailored for offensive combat.

This pattern of offensive punch continued to be a hallmark of the cavalry regiments for the next generation of cavalry leaders and soldiers. From the jungles of Vietnam to the forests of Central Europe, this emphasis on shock, firepower, armored protection, and lethality continued to be a theme in the further development of the cavalry regiment.

As the cavalry regiment evolved through the 1970's, no major force structure changes occurred, although minor organizational changes did. The air cavalry troop that had been introduced into the regiments during the late 1960's was transformed into an air cavalry squadron, providing a planning staff for the air reconnaissance squadron. Other minor changes included the addition of an air defense platoon, and a chemical troop to provide chemical decontamination and reconnaissance capabilities in the context of the European chemical threat to NATO.

Although there were only minor organizational changes within the cavalry regiments, there were many major equipment changes made throughout the 1970's. With the continued threat in Europe as the focus for a full-scale war, the emphasis on armored warfare required that the cavalry regiment incrementally improve equipment to meet the evolving Soviet threat. Units in the cavalry regiments were first issued the M-60A1 tank, which had a 105mm gun. The M60A2, with a 152mm gun similar to the M551 Sheridan, replaced the M60A1 for a two year period. The M60A3 tank, equipped with the new thermal sights, was issued to the

regiments in the early 1980's. The thermal sight gave the M60A3 tank crew the ability to see targets to 4,000 (+) meters under almost any conditions, day or night.

All three tanks continually increased the fighting capability of the regiments. This gradual increase in lethality, firepower and protection over time provided the regiments with a potent force to fight the active defense envisioned in the mid 1970's²⁶ European scenario of general war between North Atlantic Treaty Organization (NATO) countries and the WARSAW Pact nations. Emphasis on those critical war fighting issues continued virtually through the end of the Cold War.

In the late 1980's, as the Cold War continued unabated, equipment changes continued to keep pace with enemy capabilities and to take advantage of technological advances. The newest additions to the equipment fleet changed the fundamental fighting concepts of the cavalry regiment. The M1 Abrams tank, the Bradley Scout Vehicle, and the Apache Attack helicopter were incrementally introduced to the regiments from 1985 to 1992. Each system had thermal sighting systems to provide the capability of continuous operations, day and night under almost all conditions. Night fighting in the cavalry regiments became one of the focuses of training.

The M1 Abrams tank was a revolutionary tank. Although it had the same 105mm gun as older tanks, the additional armor protection, fast turbine engine, and protected crew compartment focused on battlefield speed, protection, and fire-on-the-move capabilities. The crew, even when taking a direct hit from another tank,

had a much better chance of survival. The newest technological advances in applique armor made this possible.

The Bradely Scout Vehicle, armed with a 25 mm cannon and a wire guided missile system, could now engage and destroy enemy armor out to ranges of 3,700 meters. The new scout vehicle was far better, in almost every way, than the M113 series of vehicles that it replaced. While it had a larger silhouette and made more noise than the M113 series vehicle, the newest scout vehicle had many strengths. The thermal system, improved armor plating, speed, and firepower all made the Bradley more of a fighting system than a reconnaissance system.

The Apache Attack helicopter, the first attack helicopter with all weather fighting capability, is armed with the Hellfire missile. The Apache can range to and destroy armored systems in excess of 7,000 meters.

In the early 1990's the M1A1 tank, with an improved 120mm gun, enhanced armor protection, and a very survivable crew compartment, was fielded to the cavalry. The lethality, firepower, and protection of the heavy cavalry regiment complete with the systems outlined above, was at an all time high.

During Desert Storm in February 1991, both the 2nd and 3rd Armored Cavalry Regiments deployed to the deserts of Saudi Arabia. Both regiments performed missions more oriented to attacking and defending, and less on the more traditional reconnaissance and security operations of the cavalry. The newest technology in the world, in the form of satellite imagery and airborne electronic detection devices, was used to assist the corps commanders in developing a

detailed intelligence picture of the enemy prior to G-Day. At least initially, the 2nd Armored Cavalry was used to confirm these enemy dispositions on the battlefield.

The 2nd Armored Cavalry Regiment initially performed an offensive cover for VII Corps, culminating in a hasty defense in preparation for the passage of the 1st Infantry Division.²⁷ The mission statement for the 2nd Armored Cavalry regiment read: "G-Day, H Hour, 2ACR attacks through the western flank of the enemy defenses and conducts offensive cover operations in order to develop the situation for VII Corps." ²⁸ It was during the execution of this mission that the 2nd Squadron, 2nd Armored Cavalry Regiment fought the Battle of 73 Easting, where the Tawakalna Division was fixed in place by the attacking cavalymen.²⁹

The 3rd Armored Cavalry Regiment "Veterans" essentially conducted a movement to contact, not as a covering force, to destroy forces in zone. The Veterans from Fort Bliss had come to fight. Throughout the course of the battle, the 3rd ACR conducted offensive operations, and not once reverted to the more traditional roles of cavalry. This offensive twist, having been fostered and developed in the Cold War Euorcentric cavalry organization, was the epitome of the cavalry as a fighting force. With the heaviest equipment in the world, it was far more fight than reconnaissance.³⁰

There are several conclusions that can be drawn from the historical background. First, the heavy armored cavalry regiment has essentially been developed and modernized based upon Cold War scenarios. Every modernization effort made in the past 20 years has focused on the WARSAW PACT capabilities.

limitations, and vulnerabilities. Second, the armored cavalry regiment is heavy in terms of short tons required for strategic lift. The heavy armored cavalry regiment takes almost 32,000 short tons of lift assets as compared to 15,070 short tons for the LACR. As a result, it is incapable of being deployed rapidly to another theater. In preparation for Desert Storm and with all the priority it had to move from Europe, the 2nd Armored Cavalry Regiment consumed over 36 vital days to deploy from Europe to Saudi Arabia.³¹ Third, despite doctrine that requires reconnaissance and security as the primary missions of the cavalry,³² the heavy cavalry regiment has been used as a fighting force in recent conflicts. Both in Vietnam and Desert Storm the heavy cavalry regiments were used to attack and defend and performed reconnaissance and security operations as the exception rather than the rule. Fourth, technology has provided the corps commander with a variety of intelligence sources to analyze the battlefield. With the advent of modern satellite imagery, and accurate moving target indicator systems, analysts in Desert Storm were counting vehicle positions along the Kuwait border long before the ground war started. In light of this new technology, there is always a temptation to use the cavalry as just another heavy combat organization. However, the contingency corps commander, just like the enemy commander, cannot afford to fall for deception operations that may be targeted against his electronic systems. The need to confirm information on enemy forces by ground reconnaissance remains a critical component of the battlefield. Even after he has ensured that his reconnaissance

needs have been adequately met for the coming battle, the commander should continue to use the regiment as a reconnaissance force.

Will the LACR, with much less firepower, move in the same divergent path from the traditional doctrinal roles and missions of reconnaissance and security operations? As we move into an analysis of the light cavalry regiment, it is important to remember that attack and defend missions are not normally the missions assigned to a cavalry organization.³³ With the LACR, we cannot afford another dichotomy between cavalry doctrine and execution in battles.³⁴

IV. SCENARIO ANALYSIS

The purpose of this section is to show how the Light Cavalry Regiment will be employed in contingency operations, and analyze its capability to conduct sustained operations. The scenario, not specific to any country or region, is a mid to high intensity scenario where forced entry is required. Mid to high intensity, as defined here, is a combat environment where enemy forces have like systems to U. S. Army, Air Force, Navy and Marine systems, and are capable of using those systems in an organized and sequential manner in an attempt to destroy our forces. Analysis of the LACR is based upon the following criteria: deployability, lethality, protection, continuous operations and sustainability. Data on the heavy cavalry regiment will be discussed to provide a backdrop for comparison. As the actual employment of the LACR is sequential, and linked directly (conceptually) to the seizure of an airfield by contingency forces, the general flow of this section will follow that timeline.

DEPLOYABILITY

Once alerted for deployment, elements of the LACR prepare for movement to air ports of embarkation. Deployment in this scenario is strategic in nature, and success equals a timely air deployment to the theater of operations. At these air ports of embarkation (APOE) locations, LACR elements conduct final vehicle preparation and outload on strategic airlift (C-141 and C-5 aircraft). As the LACR

cannot be deployed all at once, it must tailor its force for a sequenced deployment. The LACR will take six days to deploy from the APOE to the lodgment area.³⁵

The entire LACR is not C141 deployable and current force deployment data has allocated 65 C-5s to support the air movement into theater. There are several support maintenance systems in the support squadron that are too wide for transport by C-141 aircraft. Additionally, the M109 155mm Howitzer is deployable only by C-5 aircraft.³⁶ Although the guidance for development of the LACR has not been satisfied (the C-141 aircraft only rule), the mobility of the self-propelled howitzer has become more important than the requirement to be transported on a C-141 aircraft. (See Table 1) As the air fleet modernizes, the C-17 will phase in as the C-141 phases out. The number of aircraft needed for deployment of the LACR will decrease, as the C-17 can carry twice as much cargo as the C-141. However, only half as many C-17 aircraft will be allotted to replace the full number of C-141 aircraft. The six day deployment window will remain the same because of deployment priorities.³⁷

**TABLE 1-SORTIE REQUIREMENTS/CLOSURE
DATA³⁸**

<u>MAJOR FORCE</u>	<u>C141/C5 REQUIREMENTS</u>	<u>PROJECTED CLOSURE</u>	<u>NOTES</u>
<i>Air Asslt Rde</i>	<i>182/17</i>	<i>3 Days</i>	
<i>Heavy ACR</i>	<i>301/251</i>	<i>12 Days</i>	<i>If C-5 Air Craft Available</i>
<i>LACR</i>	<i>477/65</i>	<i>6 Days</i>	

Although the six day window for deployment is not optimum, it is the most realistic timeline given the competing demands of the Time Phased Deployment Data (TPFDD). This data base controls the movement of joint forces, and prioritizes airload schedules based upon the senior commanders requirements and priorities.

The heavy armored cavalry regiment, which takes over 12 days to deploy³⁹ (Under ideal conditions where all C-5 aircraft are dedicated to move the heavy ACR) is far too heavy to be quickly deployable in a contingency environment. In Desert Storm, it actually took over 36 days to deploy the 2nd ACR to Saudi Arabia by sea and air.

The LACR is ideally organized for this deployment. As the LACR can be incrementally phased into the combat zone (one of its requirements), a suggested phasing over time by unit is found below (Note: D-Day=LACR Deploy):

<u>Time</u>	<u>Action</u>	<u>Other Actions</u>
D-3	LACR Alerted	DRB Deploys
D-3 to D- 1	LACR Prepares to Move	DRB Secures Airfield
D to D+1	Regimental TAC Setup 1st Squadron/ NLOS and Chemical Troop Deploy	DRB/DIV
D+1 to D+2	Aviation Squadron/ MI CO/ ADA Battery(-) Deploy	

<u>Time</u>	<u>Action</u>	<u>Other Actions</u>
D+2 to D+3	CSS Squadron/ADA Battery (-)Deploy	
D+3 to D+4	2nd Squadron/Engineer Co Deploy	
D+4 to D+5	Regimental Main/HHT Regiment 3rd Squadron Deploy	
D+6	LACR closes on lodgment area/ OPCON to DRB/DIV Cmdr for Operations	
D+7	Mission Capable	

Closure at the lodgment area completes the deployment phase of the contingency

There are a number of possibilities available to decrease the deployment timeline. First, the LACR can be given strategic lift from other deploying forces, including the Civil Reserve Fleet (CRAF) aircraft. After a thorough examination, there are no additional aircraft available, either CRAF or military, to put this option into action. The second possibility is to put a portion of the LACR, such as a complete ground squadron slice afloat, much like the U.S. Marine Corps does with its marine amphibious brigade concept. This would require assistance of the U.S. Navy in providing space and transports to support contingency operations. Placement of these forces in trouble spots, along with a carrier battle group, would provide a ready reaction force at, or near a contingency area in one or two days. This deployment, coupled with the airflow of the LACR, could decrease the

deployment to four days. This is a viable option to assist in deploying the LACR in less than six days.

The endstate of the strategic deployment is the correct tactical disposition of the LACR on the ground to support the contingency operation. Once on the ground, it must have adequate firepower to successfully perform its assigned missions.

LETHALITY

There are many regions of instability throughout the world, but all areas where U.S. interests impact have tanks in their forces.⁴⁰ The primary tank of these threat forces is the T-72 variant tank. Given that, the 105mm gun on the AGS is capable of defeating all expected systems on the battlefield.

The ability of the LACR to perform on the battlefield is a function of training, but predominantly the ability of unit leaders to synchronize direct, indirect, and nonlethal fires at decisive points on the battlefield is the key to victory. Organic direct fire systems in the regiment are much more limited than those of the heavy cavalry regiment. Appendix D provides details of direct fire systems in the LACR. Appendix E provides a rather simplistic lethality comparison of the heavy ACR and the LACR. In the indirect fire arena, the LACR must count on significant augmentation, as does the heavy ACR. Nonlethal fires from the LACR Military Intelligence Company are limited and must also be augmented by strategic assets until corps intelligence systems debark and are ready for operation. A closer

examination of these systems is necessary to fully understand the LACR capabilities and limitations in this vital area.

The direct fire systems of the regiment provide the LACR with most of its lethal capabilities. The LACR is equipped with both the M113A3 Personnel Carrier and the Armored Gun System. They are the primary systems for the scout and armor crewman respectively. Additional firepower is contained in the Non-Line-of-Sight Antitank Troop, which is a separate company under regimental control.

The M113A3, as currently configured, has only a fifty Caliber Machinegun for self protection. It is a very good tracked scout platform, but does not have the firepower to fight. The carrier was selected because of its armored protection, speed, and ability to deploy on contingency aircraft. It does not match the firepower of the Bradley Fighting Vehicle, and must use more stealth to ascertain enemy dispositions.

The AGS has a 105 mm gun, and is significantly less lethal than the vehicle it replaced, the M1A1 main battle tank. The AGS was specifically designed for employment in the contingency environment, and the capabilities of the 105mm gun are still significant. The AGS can defeat any expected threat tank or antitank system in the contingency area including the T-72 tank. Most countries are equipped with some version of tank killing system that is no more capable than the T-72 (Centurion, T-55, and T-62 for example). The deployability of the AGS offsets the lethality or protection loss as a result of transition from the M1A1 tank.

The NLOS antitank troop provides a degree of lethality that combines antitank technology with future technology. The NLOS system can acquire and engage targets that are over the horizon. Exact range capabilities are classified, but over-the-horizon ranges are significant, and provide a great deal of lethality for use by the LACR. The antitank troop can provide a significant counterattack by fire role, or serve as part of a combined arms reserve to support reconnaissance operations.

The aviation squadron's Multipurpose Helicopters (MPLH) are equipped with the Hellfire Missile. The Hellfire has a range in excess of 7,000 meters, and is very effective against threat armor formations. This greatly improves the lethality of the aerial scout, but also increases the risk that the MPLH will be employed as an attack troop instead of a reconnaissance troop. This temptation must be avoided. It does, however, provide a great deal of firepower at extended ranges if needed. If the threat forces have a significant helicopter capability, the MPLH can also be equipped with the Stinger Air-to Air missile system.

The lack of large numbers of direct fire systems in the LACR that are fully capable of facing armored threats in a mid-high intensity conflict reinforce the need for stealth over fighting. At the same time, maximizing the firepower to support reconnaissance operations is essential to mission success. Indirect fire systems, when properly synchronized with the direct fire plans, provide a synergistic effective for the lethality of the LACR in reconnaissance and security operations.

Organic indirect fire systems available to the LACR include the three batteries (8 tubes each) of 155mm artillery. All of this tube artillery, however, is organic to each ground squadron to support their tactical fights. The heavy ACR and the LACR both have the same number of indirect fire systems. Although the LACR has the new 120mm mortars, which have a greater range than the 107mm mortar in the heavy ACR, the number of mortar tubes does not change. The effects of the 120mm mortar are only slightly better than the 107mm mortar, and do significantly increase the lethality of the LACR.

The LACR will most likely be the main effort for the entire theater as it deploys from the lodgment area, and has limited lethality to deal with enemy forces in the area of operations. Its mission will focus on providing some limited protection and early warning for the corps commander.⁴¹ Integration of joint systems to support both the preparation of the battlefield and the execution of operations will greatly enhance the lethality of the LACR. It is important to understand, however, that the LACR lack of lethality precludes it from conducting offensive or defensive (other than security missions) operations in a mid to high intensity conflict. Regardless of the tactical situation, the armor protection of the LACR provides a moderate compliment to the lethality of the LACR.

PROTECTION

Protection on the modern battlefield is of paramount importance to the survival of the force. There was a saying in the late 1970's that declared that if one

could be seen, one could be hit. If one could be hit, then one could be killed. The lethality of weapons, standoff ranges of antitank systems, and technology have changed that saying to: one can be hit anywhere one is. Protection in this study reflects both the inherent protection afforded by armored plate and the ability of organic air defense systems to provide coverage for the LACR in support of its assigned missions.

Most of the vehicles in the LACR are lightly armored and many vehicles do not have any armor protection at all. There are a variety of forces that operate both in the regiment and in the regimental support zone. The majority of these systems, from fuel trucks to first sergeants wheeled vehicles, are nonarmored systems. Out of the total number of vehicles in the inventory of the LACR, 1,000 (an estimate, as there is no Table of Organization and Equipment (TOE) authorized for the LACR yet), only 400 vehicles have any armor protection at all. The protection of all systems, save the AGS, is marginal at best.

The AGS has three levels of armor protection, based upon expected threat. This armor is plate technology, that can be added to meet the threat, which provides a high degree of protection for the light tank. The other tracked vehicle systems, including the M113A3 and the M109 Howitzer, provide protection against small arms fire up to the 50 caliber machine-gun. During recent simulations conducted for the LACR, the M113A3 took a severe beating at the hands of the antitank systems of the enemy forces.⁴² Consequently, the M113A3 cannot

close with the enemy, and must use stealth to operate in any future contingency operation.

The air defense weapons systems in the regiment vary from small arms and direct fire systems, to the air-to-air stingers mounted on the Multipurpose Helicopter (MPLH), to the Avenger Battery (Stinger) under the control of the regimental commander. The major killer of threat helicopters is the tank, as validated in both Battle Command Training Program and Combat Training Center battles.⁴³ The AGS, then, will most likely continue to be the big killer of helicopters on the battlefield.

The 18 Avenger (Stinger) systems, each mounted on a pedestal in a HUMMV wheeled vehicle, are capable of firing one Stinger missile at a time. Ranges of the weapon system, which does not have any thermal or radar capability, are affected by weather and limited visibility. The Avenger is equipped with a new early warning alert system that assists Avenger crews in acquiring and engaging enemy aircraft at maximum ranges. Optimum engagement ranges are approximately 5,000 meters (3 miles). Given that the LACR will most likely be the only force in contact with enemy forces, that those forces have had time to develop their air capability, and that the LACR may be spread over a 20-25 mile frontage, it is very possible that the only air defense coverage over many portions of the regimental zone will be direct fire systems in the squadrons.

The Avenger(Stinger) systems will focus their effort on protecting logistics in the Regimental Support Area, on main supply routes, and at critical command

post locations. Augmentation for both short, medium and long range systems must come from corps level air defense units that are also early deployed. Getting these assets into theater early will require additional lift in the early stages of deployment and could impact on the LACR.

The LACR has adequate armored and inadequate air defense protection for missions that it can expect to conduct in contingency operations. The AGS has the highest degree of protection, followed by the other tracked vehicle systems in the regiment. The temptation to fight must be avoided if possible. The use of stealthy, smart reconnaissance rather than aggressive, offensively oriented habits of the past must become the training standard for LACR scouts of the future. With limited air defense assets, the regiment must count on combat units to provide their own local air defense coverage. The LACR will be required to execute these missions around the clock, in good weather as well as bad weather.

CONTINUOUS OPERATIONS

The U.S. military has placed significant effort, money, and technological focus on the area of continuous operations. In the context of this study continuous operations implies the ability to fight as easily at night as during daylight hours. Modernized forces, especially the heavy cavalry regiments, have a plethora of systems to assist in fighting or conducting reconnaissance at night (See Appendix D for systems that have thermal systems installed). The heavy ACR has 239 tracked systems that have thermal capabilities (M1A1 and M3), and 55 helicopters that

also have these systems installed. The thermal system provides a daytime picture at night, using heat differentials to generate optical images in a sight picture. The passive sights, although more common in both ACR's, are barely adequate to provide the ability to fight continuous operations, especially under conditions such as fog, heavy rain, snow, and other low ambient light conditions.

The LACR will only have 114 tracked systems and 36 helicopter systems that have thermal capability. All other combat systems on the battlefield will have to rely on passive sighting systems only. The passive systems, especially the AN/PVS-7 individual night sight, are very good if thermals are not available, but do not adequately replace the thermal sighting capability.

The LACR has a greatly reduced continuous operations capability when compared with the heavy cavalry regiment. The loss is on the order of 50% or more, depending upon how final fielding of portable thermal systems fares in the late 1990's. None are currently scheduled for procurement for the LACR. Given the proliferation of passive night sights throughout the world, the LACR will have only a moderate advantage over potential enemies in continuous operations. Although the passive sight advantage of the past is gone, thermal imagery systems mentioned above provide the capability to see and shoot further than the threat, for the foreseeable future. As the LACR move into the 21st century, this continuous operations capability must remain at the forefront of emphasis in training and procurement.

SUSTAINABILITY

Sustainability is, in many circumstances, the limiting factor in combat operations. The measure of sustainment in this study has two key areas of concern: supply/services and maintenance. The LACR has an organic support squadron whose mission is to provide direct support maintenance, transportation, and limited services in support of LACR operations.

The support squadron as currently configured has company/troop designations but no equipment or personnel have yet been identified to create a detailed TOE. These TOE's will be based upon the current heavy ACR TOE, and thus will most likely be organized to provide effective organic support to the LACR. The support squadron organization is constrained, however, by a ceiling on personnel.⁴⁴ This resource limitation may adversely impact on the ability of the squadron to properly support the LACR in a combat environment.

No matter what the final organization of the support squadron evolves into, it must be capable of sustaining the LACR even in the most austere environments. Based upon consumption rates, the LACR will consume over 78 tons of supplies, 200,000 gallons of fuel, and 15,000 gallons of water daily during security operations. The data at Table 2 illustrates the complexity and daily volume of critical classes of supply that the LACR will consume. The support squadron must be able to meet these requirements with organic assets.

TABLE 2 - DAILY LACR CONSUMPTION RATES⁴⁵

CLASS OF SUPPLY	I (TONS)	III (GALS)	V(TONS)	VIII(TONS)
DAILY RATE	9.39	227,741	66.4	2.58

The support squadron has limited organic services available and must be augmented with corps assets. These services include graves registration, a critical prerequisite in any combat unit. The additional lift requirements generated by these corps slices require additional strategic lift assets not currently allocated to the LACR.

The support squadron will maintain a variety of technologically advanced equipment, from tanks to aircraft, from wheeled vehicles to contingency communications equipment. The diverseness of the equipment in the LACR will provide unparalleled challenges to the support squadron. Consequently, the final design of the support squadron must provide adequate personnel and equipment to maintain this assortment of technologically advanced equipment.

The LACR support squadron should be capable of adequately supporting the LACR as it expands from the lodgment area. The potential limitations posed by personnel constraints must be considered by the contingency planner. These limitations are no greater than for any other early deployed unit. If the support base in the contingency area can provide the necessary supplies, the LACR can sustain continuous operations.

V. CONCLUSIONS AND IMPLICATIONS FOR THE FUTURE

The United States has made a fundamental shift in policy towards a military force that is based in the United States and projected in time and space to conduct military operations. This projection of forces has caused all services to redesign and reorganize forces that can expect to be a part of these rapidly deployable forces. The U.S. Army has the requirement to project a contingency corps into a theater of operations. In the past few years, one of the most significant additions to the contingency corps has been the Light Armored Cavalry Regiment.

The Light Armored Cavalry Regiment is the most effective organization to perform the reconnaissance and security missions for the corps in a contingency theater of operations. The LACR has been organized and assigned missions similar to those of the heavy cavalry regiment, but altered to take into account the decreased lethality and armor protection of the LACR. It is strategically deployable by strategic airlift, and can perform missions assigned to it. There are a few areas of concern that planners must understand when determining the best use of the LACR in concert with other elements of the corps in combat operations.

The three ground reconnaissance squadrons provide the bulk of the reconnaissance and security forces for the regiment. Unlike the heavy cavalry regiment, the LACR must avoid fighting for information, especially if the enemy formations are either tank or antitank heavy. The scouting system in the LACR is the M113A3. It does not have the lethality to fight for information like the heavy cavalry. The LACR reconnaissance forces will rely much more on stealth, surprise,

and reconnaissance skills to develop the situation in the contingency area of operations. The LACR has very limited air defense assets to protect the regiment. The LACR has an assigned combat service support squadron and, based upon consumption rates in a mid-intensity operation, the regiment should be capable of sustaining itself in an austere environment. It does need limited support from the corps support command for essential services.

The LACR is capable of conducting continuous operations, in the conduct of both its initial reconnaissance and subsequent security operations. Threat strength, composition, and dispositions will certainly effect how successful the LACR is on the ground. A significant reduction in night vision systems (specifically thermal systems---by a factor of almost 50%) reduces the LACR capability to see at night.

Today, intelligence gathering systems have technologically assisted the commander in confirming much of his enemy information requirements. The heavy ACR has, in spite of current cavalry doctrine, become a potent offensive force for the corps. The LACR, although much lighter than the heavy ACR, must continue to confirm intelligence data for the corps commander. Failure to use the reconnaissance and security assets of the LACR in this manner will greatly reduce the efforts of the contingency corps and will put the LACR at risk.

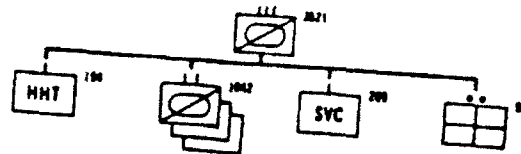
The nature of contingency operations requires speed in deployment of forces. Current timelines for the LACR, 6 days to close in lodgment area,⁴⁶ are sufficient given current regional situations. These situations could swiftly turn,

however, and it would be prudent to attempt to close the timeline to less than six days.

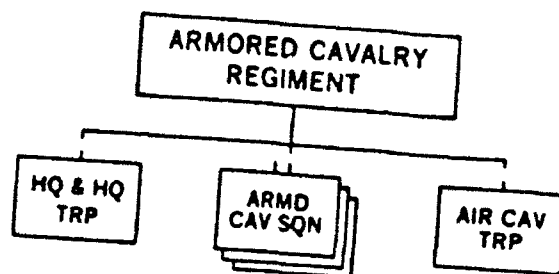
It may also be useful to examine other systems to replace the Armored Guns System. The Marine LAV, which reportedly performed well in Desert Storm,⁴⁷ uses wheels instead of heavy tracked systems. Although the use of wheeled systems may decrease cross country mobility somewhat, the advantages of a lighter system, with the same 105mm gun, and a system that is amphibious may outweigh the disadvantages.

The most important requirement for the future is to ensure that doctrine for the proper employment of the LACR is now accurately recorded in manuals and that the employment doctrine is properly followed. The heavy regiment was primarily a fighting force, in contradiction with doctrine that emphasized the primacy of reconnaissance and security missions. This doctrinal disconnect, if fostered in the employment of the LACR, could prove to be disastrous to the contingency force reconnaissance assets. The Light Armored Cavalry Regiment, with new equipment, new missions, and with an organization that can strategically deploy anywhere in the world is truly the reconnaissance force of the 21st Century.

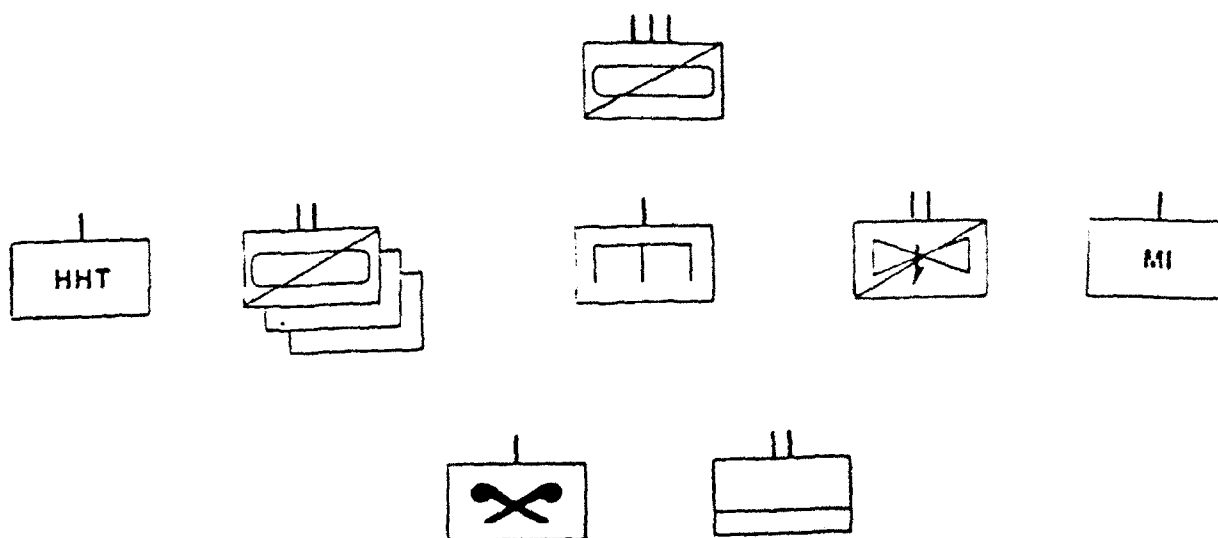
APPENDIX - A CAVALRY ORGANIZATIONS



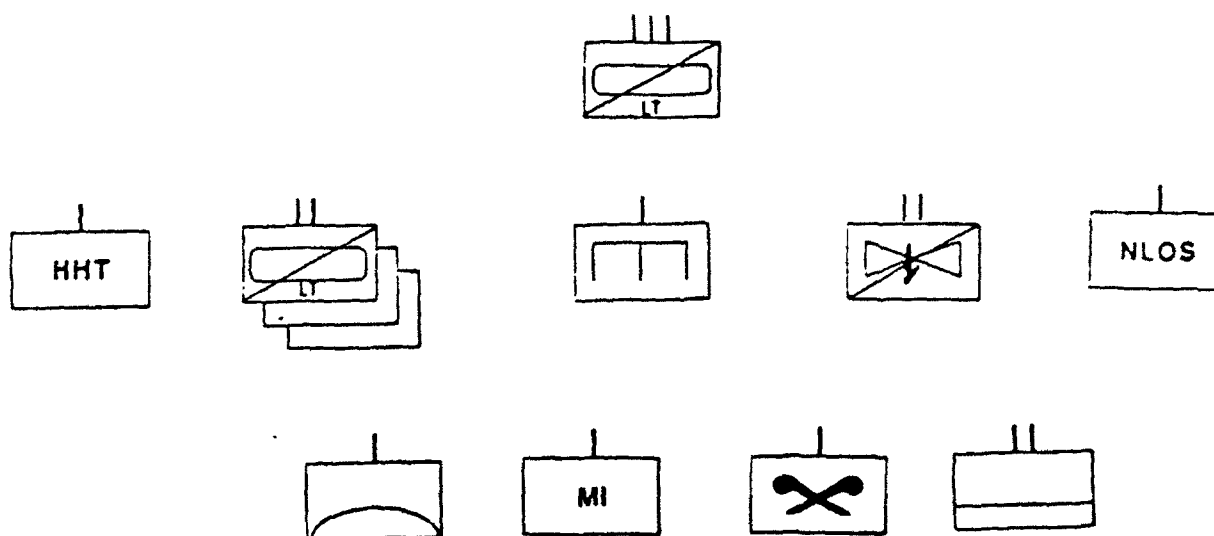
1947 Armored Cavalry Regiment⁴⁸



1967 Armored Cavalry Regiment⁴⁹



1992 Armored Cavalry Regiment



Light Armored Cavalry Regiment (LACR)⁴⁰

APPENDIX - B

TERMS AND GRAPHICS DEFINITIONS¹

Area Reconnaissance - directed effort to obtain information concerning the terrain or enemy activity within a prescribed area such as a town, ridgeline, woods or other feature critical to operations.

Attack - an offensive action characterized by movement supported by fire.

Attrition - the reduction in the effectiveness of a force caused by loss of personnel and material.

Clear enemy in zone - a requirement to eliminate organized resistance in an assigned zone by destroying, capturing, or forcing the withdrawal of enemy forces that could interfere with the unit's ability to accomplish its mission.

Contingency force - a force designed for rapid deployment to and employment in an area.

Defence-a coordinated effort by a force to defeat an attacker and prevent him from achieving his objectives.

Economy of force-the allocation of minimum essential combat capability or strength to secondary efforts, so that forces may be concentrated in the area where a decision is sought. A principle of war.

Flank guard-a security element operating to the flank of a moving or stationary force.

Indirect fire-fire delivered on a target which cannot be seen by the firing unit.

Limited visibility operations-operations conducted at night and during other periods of limited visibility.

Lodgment area-p.ml-2/1-3

Main body-the principal part of a tactical command or formation. It does not include detached elements of the command such as advance guards, flank guards, or covering forces.

Offense-a combat operation designed primarily to destroy the enemy. Offensive operations may be undertaken to secure key or decisive terrain, to deprive the enemy of resources or decisive terrain, to deceive and/or divert the enemy, to develop intelligence, and to hold the enemy in position. Offensive operations include deliberate attack, hasty attack, movement to contact, exploitation, pursuit, and other limited-objective operations. The offensive is undertaken to seize, retain, and exploit the initiative, and, as such, is a principle of war.

Reconnaissance (recon)-a mission undertaken to obtain information by visual observation, or other detection methods, about the activities and resources of an enemy or potential enemy, or about the meteorological, hydrographic, or geographic characteristics of a particular area.

Reconnaissance by fire-a method of reconnaissance in which fire is placed on a suspected enemy position to cause the enemy to disclose his presence by movement or return fire.

Route reconnaissance-a directed effort to obtain detailed information about a specified route and all terrain from which the enemy could influence movement along that route.

Security Operations-those operations designed to obtain information about the enemy and provide reaction time, maneuver space, and protection to the main body. Security operations are characterized by aggressive reconnaissance to reduce terrain and enemy unknowns, gaining and maintaining contact with the enemy to ensure continuous information, and providing early and accurate reporting of information to the protected force.

Screening force-such a force maintains surveillance, provides early warning to the main body, impedes and harasses the enemy with supporting indirect fires, and destroys enemy reconnaissance elements within its capabilities.

Guard Force-such a force accomplishes all the tasks of a screen force. Additionally, a guard force prevents enemy ground observation of and direct fire against the main body. A guard force reconnoiters, attacks, defends and delays as necessary to accomplish its mission. A guard force normally operates within the range of the main body indirect fire weapons.

Covering Force-it accomplishes all the tasks of the screening and guard forces. Additionally, it operates apart from the main body to develop the situation early and deceives, disorganizes, and destroys enemy forces. Unlike the screening or guard forces, a covering force is a tactically self-contained force (that is, it is organized with sufficient combat support and combat service support forces to operate independently of the main body).

SOURCE: Field Manual 101-5-1, Operational Terms and Symbols, Washington, D.C., 1 October 1985, p. 1-1 to 1-75.

APPENDIX - C
DATA ON CURRENT NEW COMBAT SYSTEMS FOR THE LIGHT
CAVALRY REGIMENT-1999

Multipurpose Light Helicopter -The MPLH has been designed to serve as an armed scout helicopter. It can, if properly configured, carry litter patients. It can be loaded on any air force aircraft, including the C-130 and the C-141. It has a forward looking infrared sighting system, including the ability to acquire and lase to targets in excess of 10 kilometers away, day or night. The MPLH primary weapons systems include one of the following mounted on pods: Stinger air-to-air missiles, Hellfire missiles, Hydra 70 rockets, or the 50 caliber machine gun. Its primary role in the air cavalry squadron is to provide aerial reconnaissance capability for the LACR.⁵²

Armored Gun System (AGS)-Still under final development, the AGS will replace the M551 Sheridan in the 82 Airborne Division and will serve as the light tank for the contingency corps LACR. The AGS weighs 30 tons, is air deployable in the C-130, the C-141, and the C-5A. Its main gun is the 105mm main gun, similar in capabilities to the M60 tank series gun. The gun has a soft recoil, and can fire all 105mm type ammunition. The sighting system is thermal, with a stabilized computer-based fire control system. The vehicle is 8'tall to the top of the turret, 20'long (30' including the gun tube extension), and 8.8' wide. It has an onboard smoke generation system and an NBC overpressure system. It is the primary anti-tank system in the LACR.⁵³

Non-line-of-Sight Antitank System (NLOS)-There is very little unclassified about this system. It is an antitank system, that can acquire and engage tanks that are beyond the horizon. The NLOS antitank troop, with 12 systems, will provide a more potent punch for the regimental commander to have under his immediate control. There is no current doctrine on tactical employment of the NLOS.

APPENDIX - D
LIGHT ARMORED CAVALRY REGIMENT DATA¹

Weapon system	Total #	Weight (Tons)	Weapons Range (in)	Maximum Speed (mph)	Thermal	Susim (Y/N)	C141 Deploy
M113A3	180	26.5	1,000-	40	N	Yes	Yes
AGS	114	28	2,000	45	Y	N	Yes
155 HOW (SP)	24	64	24,000	30	N	N	No
MPLH	36	3	5,000	130	Y	NA	Yes
UH-60	7	10.5	NA	170	N	NA	Yes
UH-60	8	10.5	NA	170	N	NA	Yes
120 MM	18	26.5	7,000	40	N	Yes	Yes
NLOS	12	46	4,000	60	UNK	No	Yes
SEE	6	16	NA	30	N	No	Yes
ACE	6	15	NA	30	N		Yes
VOLCAN	3		NA	40	N	No	Yes
MICLIC	3	2.8	200	20	N	No	Yes
AVENG	18		5,000	40	N	No	Yes
NBCRV	8		114	40	N	Yes	Yes

NOTE-SEE ANNEX B FOR DETAILED EXPLANATION OF WEAPONS SYSTEMS

Appendix E-Light ACR and Heavy ACR Lethality Table

A	B	C	D	E	F
Weapon System	Number of Systems	Combat Power #/ Total	Weapon System	Number of Systems	Combat Power #/ Total
MLAI	123	1049/ 129,027	AGS	114	467/ 53,238
M3	116	597/ 69,252	M113A3	180	2.69/484
107MM MORT	18	63/1134	120MM MORT	18	97/1746
AH-64	26	412/ 10,712	MPLH	36	200/7200
OH-58D	27	20/540	NA	NA	NA
UH-60	18	NA	NLOS	12	400/4800
155 HOW	24	223/5352	155 HOW	24	223/5352
STINGER	22	16/352	AVENGER	18	20/360
NBCRV	8	NA	NBCRV	8	NA
TOTAL		216,369			73,180

Note-See Annex C for detailed explanation of new weapons systems⁵⁵

ENDNOTES

¹ Gaius Julius Caesar, The Conquest of Gaul, , Translated by S A Handford, (Penguin Books, London England, 1982), 146-25.

² James R. McDonough, " Building the New FM 100-5, Process and Product", (Military Review, October 1991), 3.

³ This endstate is described in concept form only. For this study, the LACR organization is the 1999 Armored Gun System/M113A3 Armored Personnel Carrier mix.

⁴ Congressman Dick Cheney, "Strategic Underpinnings of a Future Force", (Military Review, October 1986), 9.

⁵ Harry E. Morston, "The Emerging National Military Strategy", (US Army Command and General Staff College, Fort Leavenworth, Kansas, June 1991), 3.

⁶ Briefing on Light Armored Cavalry Regiment, Fort Leavenworth, Kansas, 19 OCT 91, 1-10.

⁷ IBID: 7.

⁸ LACR Briefing, 22 July 1992, Fort Leavenworth, Ks: 1-10.

⁹ IBID: 9

¹⁰ L. James Binder, Editor, "The Soldier Armed XM8 Armored Gun System (AGS)", unauthored, (Army, September 1992), 58.

¹¹ IBID: 58.

¹² IBID: 58.

¹³ James T. Huey, "Armed OH-58D Kiowa Warrior, The Multipurpose Helicopter", (U. S. Army Aviation Digest, November/December 1990), 13.

¹⁴ IBID: 1-35.

¹⁵ Jon H. Moilanen, "The Light Cavalry Regiment in Contingency Operations", (Military Review, October 1992), 68.

¹⁶ Andrew J Bacevich, The Pentomic Era, The US Army Between Korea and Vietnam, (Washington, D.C., National Defense university Press, 1986), 12-13.

¹⁷Donn A. Starry, Mounted Combat in Vietnam, (Washington, D C, Vietnam Studies, 1969), 72.

¹⁸John Reichley, interview by MAJ Mark T. Littel, Fort Leavenworth, Kansas, 18 November 1992. Mr Reichley served with cavalry units in Vietnam in the mid-1960's and was fully aware of the ACAV and its capabilities.

¹⁹Starry: 73. It is important to note that all tactical missions, from the very beginning of the war were focused on attack and defend missions, on destruction of the enemy, not the development of reconnaissance. The 2nd Squadron, 11th Armored Cavalry Regiment, for all practical purposes, was a fighting force, not a reconnaissance force.

²⁰IBID: 142.

²¹Combat After Action Report, Operation Fargo, Headquarters 11th Armored Cavalry Regiment, 5 May 68: 7.

²²Starry: 172.

²³James H. Leach, James L. Dozier, Glenn G. Finkbiner, and George I. Forsythe, "Montana Raider", Armor, (Sept-Oct 71): 20.

²⁴Donn A. Starry, "A Report on the 11th Armored Cavalry In Southeast Asia, 1969-1970, Armor Magazine, (Jan-Feb 71): 17.

²⁵Starry, Mounted Combat in Vietnam: 74-80.

²⁶Paul H. Herbert, "Deciding What Has to be Done: General William E. DePuy and the 1976 Editions of FM 100-5, Operations", Leavenworth Papers Number 16, Fort Leavenworth, Kansas, (July 1988): 1-29.

²⁷Peter S. Kindsvatter, "VII Corps in the Gulf", Military Review, (Feb 92): 17-37.

²⁸Headquarters 2nd Armored Cavalry Regiment, "Operation Desert Storm", Saudi Arabia, 1 March 1991. This document was prepared and distributed by the 2nd Armored Cavalry Regiment as a battle summary while still in Saudi Arabia: 1-8.

²⁹IBID: 30.

³⁰It is important to note here that the VII Corps Commander, LTG Frederick M. Franks, Jr., had more intelligence than any corps commander probably ever

had in the history of warfare. Technology, via satellite reconnaissance, and through JSTARS, provided almost precise locations for most units in the Republican Guards. Unlike past battles in history, the reconnaissance forces, bolstered with a lethality never before seen on any battlefield, fought, attacked, and destroyed Republican Guard formations.

³¹ Military Traffic Management Command, Newport News, Virginia, Light Armored Cavalry Regiment (LACR) Deployability Analysis, September 1992, 20.

³² U.S. Army, Field Manual 17-95, Cavalry Operations, (Department of the Army, Washington D.C., 19 September 1991): 1-1. ; COL Molino, current commander of the 2nd Light Armored Cavalry Regiment, interviewed by MAJ Mark T. Littel, 16 Oct 92, Fort Leavenworth, Kansas.

³³ U.S. Army, Field Manual 100-5, Operations, Department of the Army, Washington D.C., 1986: 42.

³⁴ Stanley F. Cherrie, interviewed by MAJ Mark T. Littel, 26 Oct 92 at Fort Leavenworth, Kansas. COL Cherrie concurred with the assessment that the heavy ACR had become a very offensively oriented force. As the commander of Toopr H, 17th Cavalry in Vietnam, Commander of the 3rd Squadron 11th Armored Cavalry Regiment in Bad Hersfeld, West Germany, and the G-3 of VII Corps during Desert Storm, COL Cherrie is one of the experts on mounted cavalry operations. At the time of the interview, COL Cherrie was the Director of Tactics at the U.S. Army Command and General Staff College at Fort Leavenworth.

³⁵ Light Armored Cavalry Regiment Briefing, 22 July 92, Fort Leavenworth, Ks: 1-15.

³⁶ Josh Davis, telephonic interview by MAJ Mark T. Littel, 19 November 1992, Fort Leavenworth, Kansas. (Mr. Davis is a systems analyst at the U.S. Transportation Engineering Agency, Military Traffic Management Command, Newport News, Va. .

³⁷ Mr Davis, MTMC.

³⁸ Light Armored Cavalry Regiment (LACR) Deployability Analysis: 17-20

³⁹ Light Armored Cavalry Briefing, 22 July 92, Fort Leavenworth, Ks: 1-10.

⁴⁰ Moilanen. 66.

⁴¹ IBID: 3-5

¹"Air Ground Motorized Cavalry Evaluation, JANUS Results", JANUS Study conducted by the Combined Arms Combat Development Activity, Fort Leavenworth, Kansas, 10 April 1991. 1-15

²It is particularly significant that these systems do a much better job of killing helicopters than do air defense systems. There are two main reasons why this occurs. First, the density of tank killing systems is far greater than any air defense system in the U.S. Army inventory, and therefore can expect to be the main killer of heliborne aircraft. Second, the air defense systems, normally unarmored vehicles and already a scarcity on the battlefield, do not survive many of the artillery barrages that are supported by simultaneous helicopter attacks on front line units. This authors' experience at both the Combat Training Centers in Germany and California support this assertion.

³Daniel Murcoch, interviewed by MAJ Mark T. Littel, 15 October 1992, Fort Leavenworth, Kansas.

⁴Determined by using consumption data charts, in FM 101-10-1, Staff Officers Field Manual(VOL2), October 1987. 2-1 to 2-20.

⁵Light Armored Cavalry Regiment (LACR) Deployability Analysis 20

⁶Moilenen 73-74

⁷Moilenen 69

⁸Starry, Mounted Combat in Vietnam 52

⁹LACR Briefing, 22 July 1992. 22-28

¹⁰U.S. Army, Field Manual 101-5-1, Operational Terms and Symbols, (Department of the Army, Washington D.C., 21 Oct 85): 1-1 to 1-75.

¹¹Huey 13-15

¹²Army, "AGS" 59

¹³Data is compiled from: Student Text 100-9, U.S. Army Command and General Staff College, Fort Leavenworth, Ks, 1 April 92; Tactical Commanders Decision Making Course (TCDC) Battle Book, Fort Leavenworth, Ks, 1992; LACR Briefing Charts, 2 July 92, Fort Leavenworth; Field Manual 101-10-1/2, Staff Officers' Field Manual Organizational, Technical, and Logistical Data Planning Volume 1, Department of the Army, Washington, D.C., 7 Oct 87: 2-1 to 2-10

"Combat Power Coefficients for each system were obtained from MAJ David Hogg, School of Advanced Military Studies, Fort Leavenworth, Ks. MAJ Hogg is publishing a paper on the correlation of forces and the document is still in draft. The data for each vehicle comes from that data.

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